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Research article

Institutional strengthening model of oil palm independent smallholder in Riau and Jambi Provinces, Indonesia

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ABSTRACT

The oil palm independent smallholder (farmer) is one of the important actors in maintaining the continuity of the production cycle in the oil palm agro-industry supply chain in Indonesia. Various fundamental problems faced by the independent smallholder are related to land legality as well as their limited ability to manage good agricultural practices, access funds and information on current prices, and use of quality and agricultural production facilities. The institutional strengthening of the independent smallholder requires attention and support from government and other business actors in the supply chain of the oil palm agro-industry. This study aims to obtain a model of institutional strengthening through the application of the enrich seven steps of soft system methodology. The assumptions that must be fulfilled in strengthening this institution were described. The institutional strengthening model was developed in three stages, i.e., the establishment of smallholder corporations, the establishment of independent cooperatives, and the revitalization of the Indonesian oil palm independent smallholder association. Various individual strengthening actors were investigated and then integrated. The suggested institutional strengthening model involved cooperatives, smallholder farmers groups, and the oil palm mill, supported by regulatory, financial, and input provider agencies with a mutual partnership program.

1. Introduction

Oil palm plantations in Indonesia have been considered as the leading sector for increasing the country's economic growth, accounting for employment generation, as well as improving the society's income distribution (Susila and Setiawan, 2016). Currently, Indonesia has maintained its status as the largest palm oil producer in the world. Hence, this sector becomes the main sector for fostering the national economy (Joni et al., 2006), indicated by growth in investment, output, and foreign exchange (Susila and Setiawan, 2016). Furthermore, there is an increase in local smallholders' wealth, a positive contribution to economic activities in small villages, as well as poverty elimination. Plantation holding brings substantial favorable impacts to local smallholders, as indicated by the rise in the welfare index, which, in turn, increases purchasing power (Syahza, 2011).

Directorate General of Estate Crops mentioned that, in 2017, the total number of smallholders in three oil palm farming categories in Indonesia *i.e.*, smallholders, state-owned enterprises, and private enterprises reached 2,213,037. Almost 80% of smallholders (1,722,143) are concentrated in Sumatra Island, including Riau (533,905 or 24%), South Sumatra (234,797 or 10.6%), and Jambi (217,711 or 9.8%) (Dirjenbun, 2017).

The total area of oil palm plantations in Indonesia is 11.4 million hectares (ha). Of that area, smallholders hold about 4.4 million ha (44%), whereas independent smallholders hold about 3.5 million ha, and the remaining area is attributed to plasma smallholders (BPDPKS, 2017). Although independent smallholders managed almost half of the total area, its contribution to total palm oil production in Indonesia is only between 27% and 38% (Kemenperin, 2016).

In addition to low productivity, independent smallholders must make a greater effort to generate reasonable incomes as compared with plasma smallholders. However, they lack the attention of related government institutions as compared with plasma smallholders (Alwarritzi et al., 2015). Independent smallholders, working independently, frequently

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earn lower monthly incomes as compared with smallholders of private companies (Lee et al., 2014). The discrepancy was mainly caused by four major factors: (1) price distortion between plasma smallholders and independent smallholders; (2) a lack of technical management; (3) the variability of income, dependent on price changes in fresh fruit bunches, considering that the trade tends to be monopsony, and (4) inadequate knowledge of the oil palm business (Syahza, 2011).

Despite the aforementioned facts, independent smallholders are considered to be an essential element of the oil palm agro-industry supply chain. It supplies raw material for the palm oil industry, whereas the commodity it produces could serve as a buffer for particular conditions, such as extreme demand for palm oil production as well as fulfill plant capacity and ensure supply continuity. Because of this, the establishment and institutional empowerment of oil palm farmer groups as vital suppliers and actors in the supply chain could be a glorious attempt. Such an institutional approach is also aimed at improving bargaining, access to capital, production inputs, and marketing, as accommodated by various actions, to achieve effective institutional goals (FoKSBI, 2017).

Therefore, the main purpose of this study was to construct an adaptive institutional model as well as find proper strategies for strengthening the institutional aspects of oil palm independent smallholders in Indonesia. The research objectives are elaborated as follows: (1) to recognize the roles and current barriers of each stakeholder associated with institutional features of independent smallholders, (2) to obtain the key elements that substantially affect efforts to strengthen farmer institutions, and (3) to determine the most suitable strategy for enhancing farmer institutions.

Numerous institutional studies have been done. Batubara et al. (2016) designated a model of organizational networks for sustainable fishery industries, whereas Sriwana et al. (2017) applied a soft system methodology (SSM) to analyze the social dimensions of cocoa agro-industry sustainability, which resulted in future recommendations of modifying its existing functions. Ikatrinasari et al. (2009) discussed the institutional dimensions of the *agro-politan* system. Furthermore, a study performed by Udayana et al. (2010) focused on an institutional approach for dealing with risks in the palm oil-based biodiesel agro-industry, whereas Saptono et al. (2010) studied institutional design for financing agriculture sectors. Furthermore, studies covering the organizational aspects of many agricultural commodities have been extensively reported, including the supply chain of mangosteen (Astuti et al., 2010), the downstream side of the palm oil industry (Dharmayanti, 2015; Suharjito and Marimin, 2012), the organic rice business (Kusnandar et al., 2013), and the bioenergy supply chain (Genus and Mafakheri, 2014). The institutional model was also structured differently in terms of its forms, such as financing institutions and industrial clustering. In this research, SSM (Checkland and Scholes, 1999) was used, which was integrated with seven steps of institutional strengthening model development. For a better analysis, interpretative structure modeling (ISM) (Saptono et al., 2010) was also used to determine a key sub-model element structure, and strategy assumption and surfacing testing (SAST) (Edi et al., 2019) was used to determine the main assumptions that must be fulfilled.

2. Literature review

2.1. Previous institutional development studies

Syahyuti (2002) defined the fact that there are nine factors of institutional implementation failure, which involve the following. 1) Institutions are developed only for strengthening horizontal relations without paying attention to vertical relationships. 2) The institutional role is focused on control distribution, and less attention is paid to the community's social capital. 3) Management structures are arranged formally and sometimes have irrelevant requirements. 4) There are unfair distributions of development and involvement of each individual or group that threatens the social learning approach. 5) Institutional development is focused on structures, and less attention is paid to cultural development. 6) Material interests dominate institutional development. 7) If internal changes of institutions are made, then horizontal relations may be broken. 8) Political aspects are very dominant. 9) A low institution's integration for community development. Arifin (2005) defined institutional concepts into two essential aspects: 1) norms and conventions and 2) rules of the game. Occasionally, the institutional concept is written formally and implemented into the real world by the government, but in other cases, it is also defined by informal rules based upon the customary rules and norms of society. All this time, the institutional structures and rules have not presented greater benefits to society or the targeted group, because inappropriate strategies were implemented.

Innovation and actual stages are required to solve these problems. Innovation involves market situations, the agro-business, and financial problems (Kusnandar et al., 2013). Aside from that, institutional model development requires the relationship mapping of stakeholders, institutional mechanism and structure identification, and confronting threats. These may improve maintaining efficient and effective institutions. Many authors previously studied institutional model development and its problems, specifically involving the agricultural area (Ikatrinasari et al., 2009; Kusnandar et al., 2013; Saptono et al., 2010), bioenergy (Genus and Mafakheri, 2014; Udayana et al., 2010), and palm oil (Dharmayanti, 2015). These studies offered many institutional solutions involving the development of farmer group institutions, non-bank institutions, holding companies, and clustered industries.

Furthermore, to fill the research gap, this paper develops a conceptual model for strengthening the independent smallholder in the palm oil agro-industry. This research proposes a qualitative study using an inductive approach to identify real-world problems and synthesizes the results to strengthen the institutional model according to improving smallholder welfare. The qualitative research applied in this study performs a comprehensive method, using expert judgment and focus group discussions (FGDs) to deliver an applicable model. Thus, to complete the analysis, this paper also provides a business model canvas (BMC) (Edi et al., 2019) to implement the institutional model in the real-world case.

2.2. Supply chain management in the palm oil industry

The concept of supply chain management has arisen as a scientific discipline since World War II to maintain the efficient and effective management of transporting materials. Supply chain management has been implemented in many areas, and its goals are not only the transportation of materials but also the management of cash and information flows. Chopra and Meindl (2013) defined the goal of supply chain management as the fulfillment of consumer demands and the maximization of profits. The concept of supply chain management is generally applied to the industrial area. Achieving the main goals of supply chain management involves many stakeholders and activities. Supply chain management has become an enormous discipline that consists of logistics, purchasing/material management, physical distribution, strategic planning, information service marketing, and finance (Ballou, 2007). Many industries have paid more attention to this aspect of maintaining a company's competitive strategy.

The palm oil supply chain also involves many stakeholders to fulfill consumer demands and maximize profits. For instance, the palm oil supply chain in Indonesia is organized—from cultivation activities to processing—by many stakeholders, including smallholders, traders, and palm oil mills. The palm oil industry has grown extensively, and its products are used for consumer and industrial purposes (Pacheco et al., 2017). Generally, the palm oil supply chain has become a major agricultural product and is a main economic source for many developing countries, especially Indonesia and Malaysia.

As another agro-industry's supply chain problem, the palm oil supply chain also faces many obstacles in performance and coordination (Marimin et al., 2019), risk and efficiency (Lake et al., 2016; NEPCon, 2017),

and sustainability and institutional effectiveness (Marimin and Safriyana, 2018; Papilo, 2019) to increase their competitive advantage. Many researchers have given attention to this commodity to maintain the supply chain and the institutional model (Udayana et al., 2010) and develop good agricultural practices and stakeholder management (Lee et al., 2014), risk management, and value-added (S Hidayat et al., 2012; Hidayat and Marimin, 2014), and production system and financial management (BPDPKS, 2017). Furthermore, due to many "soft" obstacles in the real world that relate to business processes and smallholder welfare, this research proposes a conceptual model for improving independent smallholder efficiency to support the palm oil industry.

2.3. Soft system methodology

The SSM is a framework to explore, ask, and learn about an unstructured problem. The basic idea of SSM is derived from purposeful human activity system as a set of relational activities to demonstrate its emergence and goals (Checkland and Scholes, 1999). Human activity systems are the specific patterns that are formed by some relational activities to achieve goals. SSM uses a holistic approach to identify every item in human activity, which, assuming that it is a system, builds relationships and unity (Hardjosoekarto, 2013). The SSM approach is a productive and powerful method to learn about and organize human activities for achieving goals. SSM has been applied in many sectors including management, medical and health system planning, information system design, human resource management, logistic analysis, and expert system development. Therefore, Checkland and Scholes (1999) proposed seven steps of SSM to solve complex and unstructured problems in the real world.

The major idea of SSM is that efforts to continue improvement will enable a system to become better than it was (Rodriguez-Ulloa and Paucar-Caceres, 2005). SSM has proved its capacity to solve complex, unstructured, and divergent problems well and is recommended for solving current real-world situations (Hanafizadeh and Aliehyaei, 2011). SSM enables researchers to explain situations and describe problems through two perspectives, namely, system thinking and a real-world view. This idea makes SSM easily applied to many sectors, including new product development (Presley et al., 2000), supply chain sustainability (Sriwana et al., 2017), fishery strengthening institutional model (Batubara et al., 2016), the sugar cane agro-industry (Asrol et al., 2018), strategy formulation (Fadhil et al., 2018), financing (Edi et al., 2019), government, and organizations. Related to this research, Papilo (2019) has designed a bioenergy-based palm oil institutional model using SSM to maintain a sustainable bioenergy-based palm oil business in Riau Province, Indonesia. Furthermore, this research focuses on improving smallholder welfare through the design of an effective institutional model.

2.4. Tools and techniques

2.4.1. Interpretative structural modeling

ISM is a tool for structuring descriptive models. The basic idea of ISM is identifying complex system structures and formulating effective decision-making systems. ISM is structured into two phases: the formulation of a hierarchy and the classification of sub-elements. The hierarchical formulation aims to describe the system and extract information from the system. The hierarchical structure is also required to arrange the elements and define their relationships in forming the system. All elements in the system have to be decomposed into a number of elements.

Saxena et al. (1992) explained structuring the hierarchy and decomposing it into elements and sub-elements. Further, the relations among the sub-elements are defined by *pair-ways comparison* and a *structural self-interaction matrix* (SSIM). The SSIM is then transformed into a *reachability matrix* table using binary numbers. The results of pair-ways comparison and transformation indicate the information's *driver power* (DP) value (horizontal sub-elements) and *dependence* (D) (vertical sub-elements).

The key elements in the institutional program are divided into nine elements: 1) the program's goal, 2) the program's requirements, 3) the program's main problem, 4) benchmarking to assess the goal, 5) the involved institutions, 6) the affected society, 7) the possible change, 8) activity requirements, and 9) activity measurements. These elements must be decomposed into sub-elements and are then defined into contextual relationships using symbols. The contextual relationships among the elements are described in Table 1.

Saxena et al. (1992) has classified sub-element values into four sectors: sector I (*weak driver-weak dependent variables (autonomous)*) with DP < 0.5 X value D < 0.5 X, sector II (*weak driver-strongly dependent variables (dependent)*) with DP < 0.5 X D > 0.5 X, sector III (*strong driver-strongly dependent variables (linkage)*) with DP > 0.5 X and value D > 0.5 X, and sector IV (*strong driver-weak dependent variables (independent)*) with DP > 0.5 X; and the value of D < 0.5 X. X is defined as a number of sub-elements.

Different from hierarchical methodology in general, through the use of ISM, a picture of the structural and sub-elemental relationships in a program can be obtained. ISM can structure elements clearly and sequentially. Furthermore, with ISM, the key sub-elements that are the focus for solving each problem can be known with certainty. ISM has been implemented in many research areas, for instance, in performance management systems (Liu et al., 2012), the fisherman institutional model (Batubara et al., 2016), cocoa agro-industry institutions (Sriwana et al., 2017), financing institutions (Edi et al., 2019), and the bioenergy-based oil palm institutions model (Papilo, 2019).

2.4.2. Strategy assumption surfacing and testing

SAST is a framework to improve a system through assumptions that can be applied to the real world easily. SAST focuses on critical and basic assumptions that can run the conceptual model, realize planning, and define the strategy for improving the system. SAST should stand as the main principle of adversarial, participative, integrative, and managerial mind supporting. Therefore, below the five stages for defining assumptions using the SAST technique (Mason and Mitroff, 1981) are listed.

1. To define assumptions, groups that understand the institutional/system problem should be involved. The assumptions are then extracted from actors using FGD.
2. FGD is required to discover significant assumptions for supporting strategies to improve and apply the conceptual model in the real world.
3. All assumptions are assessed for importance and certainty levels by the group using the Likert scale (1–7).
4. Assessment results are discussed in an expert group to find related and consensus assumptions.
5. In the synthesis stage, assumptions that may produce improvement in the actions taken to strengthen the system/institution are found.

2.4.3. Business model canvas

BMC is a tool to design, visualize, and describe a business idea, reflected in a canvas that can be easily designed to plan a creative business model. Osterwalder et al. (2010) proposed nine blocks of BMC that can be used to describe a business model, including key activities, key partners, key resources, cost structures, customer relationships, customer segments, value prepositions, channels, and revenue streams. All ideas related to business are described in each block of BMC. Designing a business model using BMC is a cyclical process that may be revised during business implementation in the real world.

BMC has been applied to many research areas, for example, in developing new product sales situations models (Averbeck et al., 2013), developing sustainable business for an industry (Joyce and Paquin, 2016), modeling financing business models (Edi et al., 2019), and social enterprise modeling for the onion agro-industry (Pamungkassari, 2018). This research deployed BMC to capture all relational elements in

Table 1. Symbols and definitions to assess contextual relationships.

Symbols	Definitions	
V	If sub-element *I* has a contextual relation to sub-element *j*, but sub-element *j* has no contextual relation to sub-element *i*	$e_{ij} = 1$ and $e_{ji} = 0$
A	If sub-element *I* has no contextual relation to sub-element *j*, but sub-element *j* has a contextual relation to sub-element *i*	$e_{ij} = 0$ and $e_{ji} = 1$
X	If sub-element *I* has a contextual relation to sub-element *j*, and *vice versa*	$e_{ij} = 1$ and $e_{ji} = 1$
O	If sub-element *I* has no contextual relation to sub-element *j*, and *vice versa*	$e_{ij} = 0$ and $e_{ji} = 0$

applying the institutional model to strengthening independent smallholders in the real world.

3. Methods

3.1. Research framework and stages

This work adopted SSM as exhibited in Figure 1. First, problems were identified, enabling the researchers to collect information related to the needs and constraints of each stakeholder in the palm oil smallholder industry. To identify problems, the researchers used the FGD technique and conducted direct interviews with relevant actors, such as smallholders, traders, cooperatives, palm oil companies, government officials, and academicians. In the FGD, respondents may discuss and deliver arguments according to proposed specific problems. Thus, the FGD will achieve a consensus that accommodates many perspectives based on the expertise of the respondents.

Subsequently, strategies were required for strengthening smallholder organizations that were constructed using the SSM framework. As an attempt to strengthen the analysis, this study also used the ISM method (Saxena et al., 1992; Sriwana et al., 2017) and the SAST method (Mason and Mitroff, 1981; Pradini et al., 2016). ISM was used to compose a conceptual model and gain key elements of institutional problems (Attri et al., 2013; Talib et al., 2011), whereas SAST was used to determine the appropriate strategies that should be used to reinforce the institutional aspects of smallholder farmer groups (Barabba and Mitroff, 2014).

The seven steps of the SSM approach that were applied in this research are as follows:

1. Identifying the current conditions and problems related to farmer institutions, focusing mainly on connections between counterparts, from policy aspects issued by the government to technical levels in business actors;
2. Understanding the constraints faced by stakeholders given their needs, roles, and responsibilities. This stage enables the creation of rich pictures that depict interconnections between the problems faced by stakeholders;
3. Defining the role of each group based on an approach called client or customer, actor, transformation, world view, owner, and environmental constraints (CATWOE);
4. Designing a conceptual model that describes the activities and interconnections between the activities needed to synthesize the best solution for strengthening the institutional aspects of smallholders. Additionally, this step enabled us to find key elements that significantly influence the strengthening efforts based on ISM;
5. Composing the arrangement of actual activities and then comparing those to the conceptual model;
6. Defining possible changes, including procedures, structures, and cultures in the form of values, norms, and ways of thinking. Such changes also occurred by developing strategic assumptions of attempts to improve the institution of smallholders, performed with the aid of SAST.
7. Implementing an appropriate strategy for strengthening smallholder institutions, which is based on assumptions and recommendations. Next, the overall results modeled for institutional strengthening were summarized in the form of a modification of the BMC, which is easily applied in the real world (Edi et al., 2019; Osterwalder et al., 2010).

3.2. Data collection

In this research, data were obtained through direct interview and FGD. The direct interview focused on key persons/institutions at each

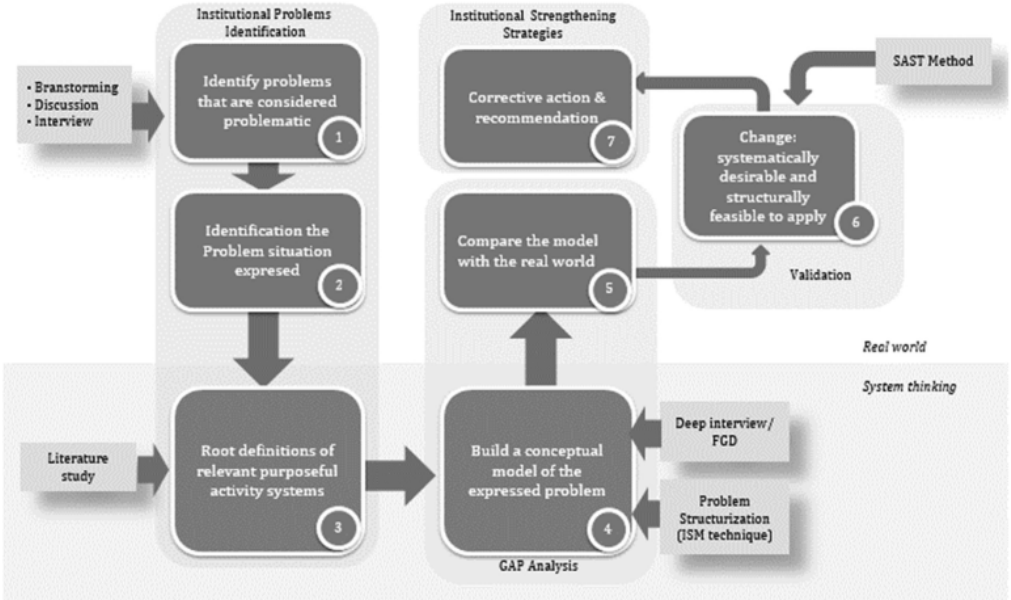

Figure 1. Research framework (as adopted from Checkland and Scholes, 1999).

supply chain level, involved 20 smallholder champions, four key trader/smallholder cooperative institutions, and two local governments in the Riau and Jambi Provinces. Designing the institutional model for the palm oil industry required comprehensive argumentation from various perspectives; therefore, a FGD was conducted. We held FGDs three times, which were followed by supply chain stakeholders, related agencies, local governments, and institutional experts. The FGD respondents/experts were selected through purposive sampling, which would involve in the model, understand the problem had the ability to argue for and influence the institutional model. The data reliability and validity were determined at the expert election phase, which would give any argumentation and assessment in this research. Further, the final conceptual model results were also re-validated by the expert group in the second and third FGDs.

The first FGD was held in the Riau and Jambi Provinces to capture real-world problems in the palm oil supply chain, collect related information, and propose a big idea for strengthening palm oil smallholders. In this phase, all related stakeholders were involved, especially smallholders, traders, and palm oil mills from each province. At the second FGD, researchers and experts discussed in formulating an appropriate conceptual model to solve real-world problems. The real-world problems captured at the first FGD were discussed and analyzed to develop appropriate solutions. Finally, at the third FGD, the institutional model was delivered to stakeholders in Riau and Jambi and received responses for improving the model. A brief description of the sequential FGDs is depicted in Table 2.

This research adopted expert assessments to develop the conceptual model and formulate implementation of the strategic model. In this case, experts in the field of oil palm plantations, the oil palm industry, and related institutions were selected. The resource persons consisted of professionals from various institutions, the government, business actors, oil palm independent smallholder associations, and researchers in the institutional field of oil palm independent smallholders. The areas of expertise of the experts involved in this study are listed in Table 3.

3.3. Data analysis and conceptual model development

Data confirmation and situational analysis of institutional oil palm independent smallholders were also performed through interviews and field observations in the provinces of Riau and Jambi during the period of January through March 2019. The larger framework of the research follows Checkland's (1999) SSM model, which has been described in Figure 1. This research uses the qualitative method and inductive approach based on case studies of palm oil institutions and businesses in Riau and Jambi Provinces, Indonesia.

Based on the research framework depicted in Figure 1, the first stage of the research is performed through the analysis and synthesis of the data and information obtained. The data and information were outlined in the form of a rich picture to deliver a brief and comprehensive problem in the field. Further, the rich picture is translated into CATWOE analysis, and the root definition of institutional strengthening of independent smallholders was formulated. The root definition formulation was used as a basis in building a conceptual model of institutional strengthening. The conceptual model to strengthening institutional models for independent smallholders was designed through ISM and the implementation strategy was formulated by the SAST method. A brief description of conceptual model development and strategy formulation follows.

3.3.1. Conceptual model development using ISM

The conceptual model was built based on the results of identifying key elements in the process of institutional strengthening of independent smallholders using the ISM method. As stated by Saxena et al. (1992), there are nine elements to consider in designing an institutional model, but this paper uses only five elements. These elements are assumed to represent all situations and fulfill the real-world requirements based on field observations and expert group opinions. These elements and sub-elements are presented in Table 4.

Table 4 summarized the five main elements, with a total of 54 sub-elements, for designing an institutional model. Further, the key sub-elements of each element are determined using ISM. Experts provided pair-ways comparisons of sub-elements to figure out which sub-element had strong driver-strongly dependent variables and set it as a key element. The detailed technique to discover the key sub-elements using ISM has been provided in the literature review.

Each element may have more than one key sub-element to formulate the conceptual model. Further, the conceptual model should accommodate all key elements that are found using the ISM technique. The conceptual model is designed as the way to formulate a strategy to overcome the gap between real-world conditions and the conceptual model.

3.3.2. Determining strategic assumptions using SAST

Identification of the strategy assumptions is done using the SAST method. SAST comprised five stages that were defined in the literature review. The basic assumptions are produced by FGD to define the related assumptions in applying the conceptual model. The expert group, who understands the palm oil institution's problems, assessed all assumptions using a Likert scale (1–7). The assessment results are mapped on to a Cartesian graph to define the position of each assumption.

3.3.3. BMC to implement the institutional model

As the final part of this research, a business model using BMC was used to implement the institutional model in the real world. The BMC is designed using nine blocks of canvas, which was proposed by Osterwalder et al. (2010). The conceptual model to strengthen the independent palm oil smallholder is described in the BMC in detail to be easily applied to the real world. All components of the BMC are discussed with experts and are confirmed to the stakeholders in the field through FGD. Further, this paper proposed a BMC modification to describe the

Table 2. Focus group discussion (FGD) and respondents.

FGD number	Location	Goal	Respondents
1	Riau and Jambi Provinces, Indonesia	To coordinate research and capture the complete situation and information on the palm oil-based industry institution in Riau and Jambi Provinces.	1. Local governments 2. Smallholder associations 3. Palm oil mill associations 4. Palm oil companies 5. Local university and researchers as experts
2	Bogor, Indonesia	Formulate an appropriate solution and design for palm oil mill institution in Riau and Jambi Provinces.	1. Experts in oil palm farms 2. Experts in institutions design 3. Experts in palm oil supply chain
3	Riau and Jambi Provinces, Indonesia	Report the institutional design results and achieve the field's responses to improve the model.	1. Local governments 2. Farmers' association 3. Palm oil mill associations 4. Palm oil companies 5. Local university and researchers as experts

Table 3. Areas of expertise of the experts involved in this study.

No	Expertise/Profession
1	Academician and researcher in the topic of institutional studies
2	Academician and researcher in oil palm field
3	Academician and researcher in oil palm field
4	Academician and researcher in supply chain
5	Head officer of the Department of Food and Estate Crops, Province of Riau
6	Officer in the Department of Food and Estate Crops, Province of Riau
7	Head officer for institutional affair in Department of Cooperative and Small Enterprises, Province of Riau
8	Secretary in Indonesian oil palm smallholder association (Asosiasi Petani Swadaya Kelapa Sawit Indonesia, *Apkasindo*), Province of Riau

Table 4. Elements and sub-elements of institutional problems.

Element	Sub-Element
Need	1. Awareness of independent smallholders to group or join in an institution 2. There are parties or figures who are "honest, trusted, do not have personal interests" as role models/motivators for the implementation of institutional independent smallholders. 3. Support (rules/policies, funding, and fostering) of the central and regional governments that support institutional strengthening of independent smallholders 4. Support from the palm oil industry/mill to partner with independent smallholder institutions 5. Managerial capacity of management/manager for institutional governance
Objective	1. Increase in independent smallholders' business income 2. The creation of clear cooperation between independent smallholders and other business actors (facility suppliers and palm oil mills) 3. Government and related-party support in creating market access certainty for independent smallholders 4. An increase in the quality and productivity of independent smallholder FFB 5. Availability and smooth access and financial support from financial institutions to increase the efforts of independent smallholders
Possible changes	1. Easy access to information on seed prices, fertilizer prices, and the selling price of FFB 2. Ease of getting quality seed and facility assistance for independent smallholders at the appropriate price level 3. The realization of stronger cooperation and partnerships among actors 4. The creation of transparency, certainty, price stability, and marketing along the palm oil supply chain 5. An increase in the ability and skills of independent smallholders in the management of oil palm plantations in a good agricultural practices (GAP) and sustainably 6. Facilitate the government in providing support and attention to increasing the ability and productivity of independent smallholders 7. Facilitate the government in supervising and controlling the government in the implementation of trading systems and commodity prices for independent smallholders 8. Increased bargaining positions (independent bargaining) for independent smallholders 9. Legally guaranteed supply of quality and "legal" FFB
Party	1. Oil palm independent smallholder cooperatives 2. Indonesian Oil Palm Smallholder Association (*APKASINDO*) at the regional level 3. Association of Indonesian Palm Oil Entrepreneurs (GAPKI) at the regional level 4. Palm Oil Processing Industry/Factory 5. Horticulture and Plantation Food Service 6. Office of Cooperatives and SMEs 7. Trade Service 8. Forestry and Environmental Department
Constraint	1. Institutionalization is considered not to provide significant benefits for independent smallholders. 2. Lack of trust of independent smallholders in the existing institutional functions 3. The influence of traders/collectors is still strong. 4. Lack of commitment of independent smallholders to the decision-making process and institutional activities for a common goal 5. Lack of awareness of independent smallholders on the importance of institutional existence 6. There is a conflict of interest from institutional management. 7. Lack of managerial capacity for existing institutional management

institutional model. The nine blocks of canvas in the BMC are modified by adding two blocks, namely, benefits and obstacle factors. Thus, the modified BMC consists of these blocks: key activities, key partners, key resources, proportion of value, customer segmentation, channels, benefits, and obstacle factors.

4. Results and discussion

4.1. Problematic situation

4.1.1. Institutional issues and the problems of independent smallholders

Following the framework of this study, the initial stage being implemented was working to decipher the underlying issues and problems of institutional problems occurring for oil palm independent smallholders. At this stage, the problem was presented in the causality relationship of one group of business actors to another group of business actors. The problems presented in the data were difficult to trace but, in fact, could still be found in the field.

Based on the results of the identification of problems in the field, a number of facts related to institutional problems of independent smallholders could be found. However, if explored further, the main problem in the palm oil supply chain is the selling price of fresh fruit bunches (FFB) of oil palm. In general, oil palm companies consider FFB produced by independent smallholders to be of lower quality, productivity, and yield as compared with FFB from oil palm partner companies (plasma), such that the selling price received by independent smallholders is lower. This is due to the use of non-standard-quality seeds (and varieties), fertilization, and types of fertilizers that are of less quality as well as the implementation of GAP that are not in accordance with the provisions.

In general, the FFB flow from independent smallholders occurs through intermediary traders (commonly referred to as collectors or "*Peron*"), which are then sent through palm oil mill fruit supplier partners, or large "holder" delivery order traders of oil palm mills, in this case, abbreviated by PB. In general, collectors or "*Peron*," are partners or agents of PBs. Most of the palm oil mills at the study location were only willing to accept FFB from PBs. There are variations in PB status in supplying FFB to oil palm; some are "freelance," and others are agents or representatives of palm oil mills. Some PBs received capital assistance. To become a PB, palm oil mills set various requirements, including capital capability, minimum amounts, or volumes of FFB that can be supplied by PB candidates, as well as a guarantee that the FFB supplied does not originate from protected areas.

In relation to the price of FFB, independent smallholders are positioned as "price takers." The selling price of independent smallholders is determined by collectors (*Peron*), which are based on the purchase price set by PBs by considering the quality of the FFB (maturity, number of seedlings, types of seeds, and length of bunches). PBs determine the purchase price to collectors (*Peron*) based on information on the purchase price of palm oil mills. PBs' buying prices to collectors are based on the purchase price range set by the palm oil mill. There are variations in the purchase price of FFB or FFB quality conditions that are set between one palm oil mill and another palm oil mill—for both within a region and between regions. This is one of the factors that has not yet been realized in the cluster policy or regionalization of the FFB supply for palm oil mills.

Regarding the purchase price of FFB by palm oil mills, at the provincial level, there is a mechanism for setting the price of an agreement, which is decided through a meeting held by the Plantation Office by representatives of palm oil mills (*Gapki*), farmers *(Apkasindo)*, and related stakeholders. A growing issue is that the price of the agreement that is set every month at the provincial level is not fully implemented by palm oil mills, moreover, at the level of intermediary traders. The factors and parameters considered in the calculation of the agreement price are more oriented to nucleus-plasma farmers and do not consider the conditions and quality of independent smallholder's FFB. Information about the parameters used has not been well socialized, giving rise to negative perceptions regarding the mechanism for determining and agreeing upon prices for FFB.

As noted, the access of independent smallholders to sell FFB directly to palm oil mills is very limited, thus causing a high level of dependence on intermediary traders (platform). The high dependency is also due to being bound by the "bonded" system because intermediary traders (platforms) are able and willing to meet the needs of cash or capital with easy and lightweight requirements. Basically, the bargaining position of independent smallholders in the palm oil supply chain is low. Strengthening this bargaining position can be achieved if independent smallholders are willing to gather into groups or cooperatives. Most of the independent smallholders in the study location have not yet gathered into farmer groups or cooperatives.

Although these institutions have previously existed, most of them do not function or play a role in the marketing activities of their members' FFB production, or in terms of providing inputs for production facilities in oil palm cultivation activities. Strengthening of this bargaining position can be accomplished if farmers are willing to gather in groups or cooperatives, and this has been proven by the existence of several successful institutional case cooperatives of joint business groups (KUB). Based upon the "success stories" of institutional farmer groups or cooperatives in the study location, several determinants of institutional success, both in the form of farmer groups and cooperatives, are the existence of informal leaders of independent smallholders as intermediary traders who voluntarily want and can motivate independent smallholders and transparency in institutional management. The agency has benefited the farmers and has the support of the Regional Government (Plantation Office or Cooperative Office) in various programs such as the replanting program and ISPO certification.

4.1.2. Institutional issues interrelation

The problem, in the context of strengthening oil palm independent smallholder institutions, does not stand alone but is related between parties/levels, which demands a comprehensive solution to cover the strategic and operational levels. The interrelationship of the problem situation between the parties and levels of the palm oil institution is presented in Figure 2.

The existing problems from the perspective of the relationships between the conditions and the roles of each party are depicted in the form of a rich picture. The rich picture illustrates the problems in terms of policy issues, cross-sectoral relations, and the technical side. The rich picture also serves to describe situational analysis and make unstructured problems easier to understand and structure. The rich picture of the problems in the supply chain institutions of the oil palm agro-industry is depicted in Figure 3.

4.2. Institutional forms of independent smallholders

Strengthening the institutions of the oil palm agro-industry requires preliminary studies on the forms and models of existing and developed institutions in the field. The form and strengthening of the palm oil agro-industry institutional model will be developed based on situational analysis and refer to the appropriate institutional forms. There are several forms of agricultural and agro-industrial institutions that can be used as references in strengthening the institutions of oil palm smallholders, including independent cooperatives, nucleus-plasma plantations, and one-stop management. Components and descriptions of institutional forms in the field are described in Table 5.

4.3. Root definition formulation

Following the stages in the SSM approach, the formulation of the conceptual model begins with formulating the root definition of the problem situation of institutional strengthening, through the identification and analysis of CATWOE. CATWOE is decomposed into Customers, Actors, Transformation, World views (weltanschauung), Owners, and Environmental constraints. The formulation of the definition of the root (root definition) is the stage of thought of researchers in identifying and transforming systems. CATWOE identification and analysis were developed from the analysis of problematic and rich picture situations. Based on FGD and field observations, the CATWOE elements that have been successfully identified and analyzed are as follows:

Customer	:	The parties who benefit or "can" become victims of the strengthening model, which, in this case, are the palm oil smallholders and intermediary traders
Actors	:	The parties that perform essential activities to strengthen the institutions of palm oil independent smallholders, which, in this case, are the plantation office, oil palm agro-industry, and assistance institutions
Transformation	:	The process of empowering palm oil independent smallholders, as well as the active participation of relevant supervisory agencies and the palm oil agro-industry to strengthen or realize independent palm oil smallholder institutions
Weltanschauung/ World view	:	The realization of a strong independent smallholder institution to increase the income of independent smallholders and the performance of the supply chain to ensure a sustainable and quality supply of FFB

(*continued on next page*)

(*continued*)

Owner	:	The parties who can or have the power to stop or change the process, which, in this case, are the local government, the plantation service, the industry service, the cooperative service, and the BPDPKS
Environment	:	Constraints of the system that are outside the scope of the model studied, which, in this case, are policy conflicts, land use conflicts, strong influence/role of "collectors" in the palm oil supply chain

Referring to the results of CATWOE identification and analysis, the root definition of the institutional strengthening model for oil palm smallholders is formulated as follows, "A model strengthens independent institutional oil palm growers based on smallholders' participation and loyalty through mentoring/facilitating by the relevant agencies, oil palm agro-industry, and community organizations synergistically so it can increase the income of oil palm smallholders and FFB supply chain performance to ensure a sustainable and quality supply of FFB". Next, the root definition will be developed into a conceptual model for transforming the system.

4.4. Conceptual model of independent smallholder institutional strengthening

The conceptual model of institutional strengthening in this study refers to the institutional elements developed by Saxena et al. (1992). Saxena et al. (1992) posited that there were nine key elements for institutional strengthening/design, but in this study, only five key elements were analyzed that were most related to the definition of the institutional roots of the palm oil supply chain. Based on the root definition in building a conceptual model of institutional strengthening is enriched by FGD, the involved elements include (i) the needs in the framework of strengthening independent smallholder institutions, (ii) the purpose of strengthening, (iii) changes made possible by strong independent smallholder institutions, (iv) the parties that play a role in the strengthening process, and (v) the constraints faced in the context of institutional strengthening. In each key element, the financial sub-element is further defined as a factor in institutional strengthening based on the results of situational analysis and the rich picture. Furthermore, the sub-elements identified in the institutional strengthening element were stated at the method.

The analysis was continued with the determination of key sub-elements for each element of institutional strengthening. The key sub-elements were obtained through ISM analysis techniques based on expert judgments. The results of the analysis of key elements and sub-elements through ISM could also be identified with hierarchical structures of relationships between sub-elements and the influences (driver powers) of sub-elements. The key sub-elements are aspects that have the

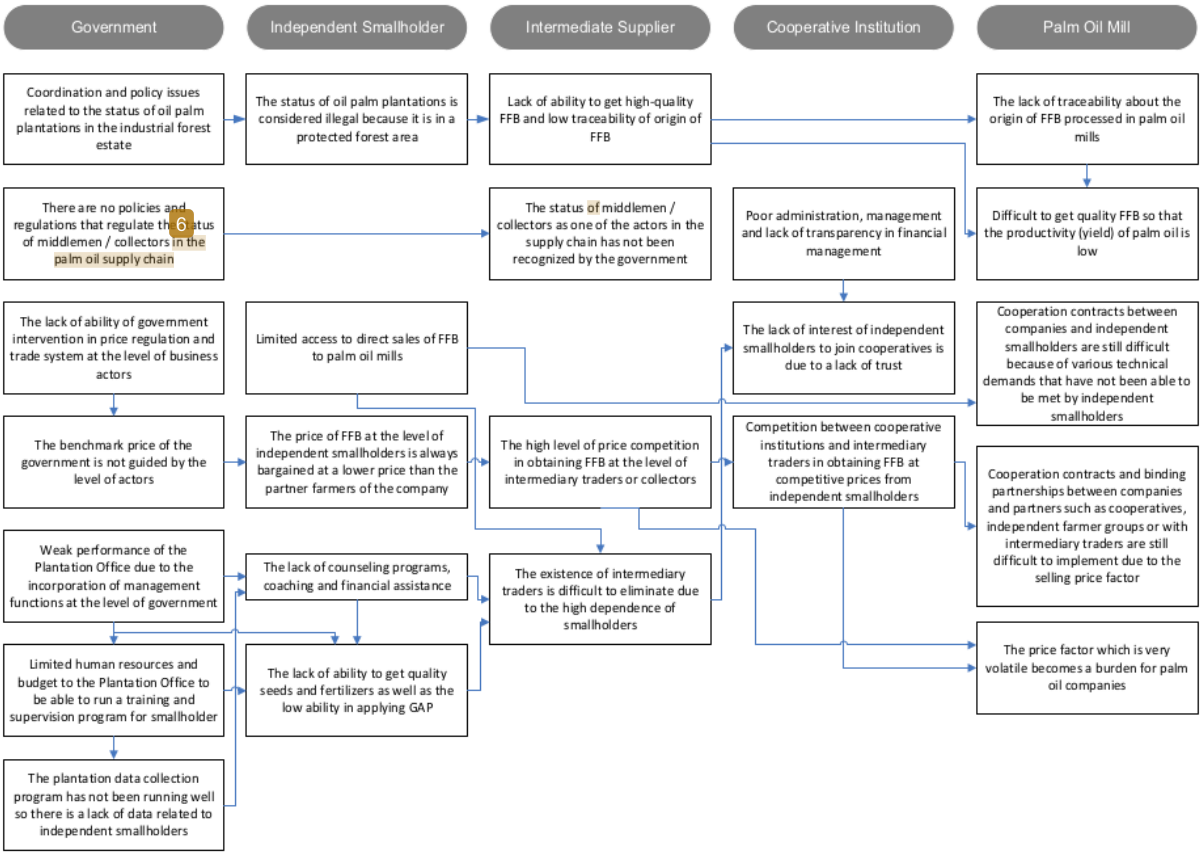

Figure 2. Problematic linkages among various levels related to strengthening independent smallholder institutions.

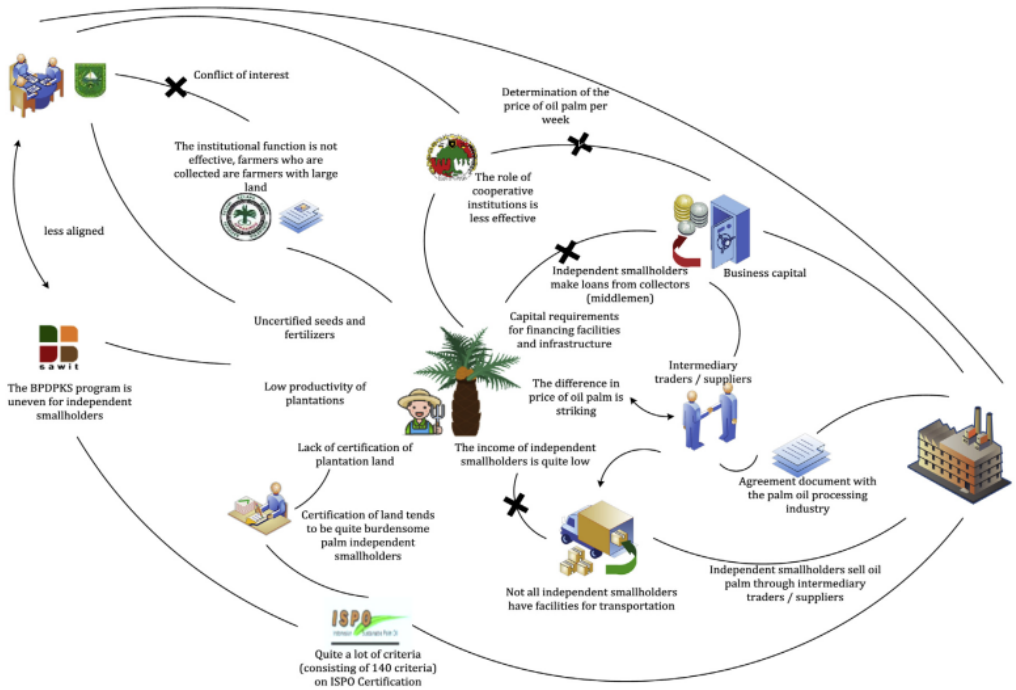

Figure 3. The rich picture of institutional strengthening of oil palm independent smallholders.

Table 5. The form and description of the institutional model.

Description	Institutions form		
	Independent cooperative	Plasma cooperative	One-stop management
Institutional component	Smallholders – group of smallholders – cooperative	Smallholders – group of smallholders – cooperative	Smallholders – group of smallholders – cooperative – palm oil company
Smallholder role	1. Farm owner 2. Labor provider 3. Farm management developer 4. Plantations management	1. Farm owner 2. Labor provider 3. Plantation management	1. Farm owner 2. Wage labor
Smallholder group role	Coordination among smallholders in plantation and marketing activities	Coordination among smallholders in plantation and marketing activities	Coordination among smallholders in plantation activities
Cooperative role	1. Facilitating smallholder needs, facilities, and infrastructure 2. Planning and managing replanting fund (funding from BPDP KS and bank credit) 3. Managing FFB marketing 4. Managing smallholder credit returns 5. Representing smallholder interests	1. Managing FFB marketing 2. Managing smallholder credit returns 3. Representing smallholder interests	1. Coordination among smallholder groups 2. Managing FFB transportation 3. Representing smallholder interests
Company-partner role	Processing FFB and selling the FFB process results	1. Plantation replanting 2. Processing FFB and selling the FFB process results 3. Planning and managing replanting fund (funding from BPDP KS and bank credit) 4. Avalis 5. Managing smallholder credit returns	1. Plantation replanting 2. Managing smallholder plantations operation 3. Processing FFB and selling the FFB process results 4. Profit-sharing of plantation results 5. Planning and managing replanting fund (funding from BPDP KS and bank credit) 6. Avalis 7. Managing smallholder credit returns

Source: Regulation of Ministry of Agriculture, Republic of Indonesia Number: 67/*Permentan*/SM.050/12/2016.

highest power drivers that determine or influence other sub-elements. ISM analysis results showed that there were two key elements of the needs element, namely, the presence of parties or figures who are "honest, trusted, do not have personal interests" as a role model/motivator for the implementation of independent smallholder institutions (E2) and an increase in FFB quality and productivity by independent smallholders (E4). The form of hierarchy and power driver diagrams on the elements of need as the result of ISM analysis is depicted in Figure 4.

Overall, the results of the analysis of the key elements using the ISM technique successfully determined six key elements for the institutional strengthening of oil palm independent smallholders. A description of the key sub-elements for each element in the framework of institutional

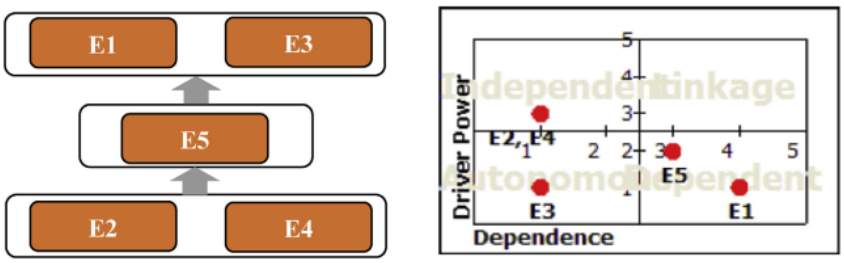

Figure 4. (a) Hierarchy and (b) driver power dependencies diagram for the element needs.

Table 6. Key elements and sub-elements of institutional strengthening.

Element	Key Sub-Elements	Descriptions
Need	o There are parties or figures who are "honest, trusted, do not have personal interests" as a role model/motivator for the implementation of independent smallholders' institutions. o Support from the palm oil industry/mill to partner with independent smallholder institutions.	o An honest figure is interpreted as a role model of independent smallholders who has a good personal relationship with interested parties. o The support of industry players is generally given more to traders or partner smallholders, especially in terms of the interest being supplied raw materials. The dependency relationship between independent smallholders and the oil palm industry/mill should be able to provide mutual benefits between the two parties.
Objective	o Availability and smooth access and financial support from financial institutions to increase the efforts of independent smallholders	o The need for government involvement and the availability of media and communications that can provide support for easy access to capital, both from bank financial institutions and non-banks for independent smallholders.
Possible changes	o Easy access to information on seed prices, fertilizer prices, and the selling price of FFB.	o The lack of existing media and information channels causes independent smallholders to sometimes suffer losses due to the low selling price of FFB received by smallholders or the high price of seeds and fertilizer that must be paid.
Need	o Indonesian Oil Palm Smallholder Association (*Apkasindo*), at the regional level.	o The existence of *Apkasindo* with related agencies is expected to be able to become the initiator and facilitator in the context of developing and strengthening independent farmer institutions in the village or sub-district area.
Objective	o There is a conflict of interest from the institutional management.	o Conflict of interest is defined as an attitude that is less objective that tends to prioritize the interests of certain individuals or groups. This can be seen in the attitudes shown by managers of independent smallholder institutional organizations in the decision-making process or transparency in budget management.

strengthening of oil palm independent smallholders is presented in Table 6.

The conceptual model was developed from the key elements that were explained in Table 6. The conceptual model illustrates the relationship between the activities and roles of each party to achieve the target as well as the basis for efforts to solve the main problem of strengthening the institutional capacity of independent oil palm smallholders. Each role has a complementary relationship, and sometimes, due to limitations, the high level of need will be a source of problems that must be solved. Actors involved in designing the conceptual model for increasing the competitiveness of independent smallholders are the government, independent smallholders, *Apkasindo*, cooperatives, traders, and palm oil mills. According to Checkland and Scholes (1999), the conceptual model to improve the system is described in a purposeful activity model. The description of the conceptual model and key sub-elements for institutional strengthening of the independent oil palm smallholders is shown in Figure 5.

4.4.1. Strategic assumptions for independent smallholders' institutional strengthening

Strategic assumptions need to be established as a prerequisite for the implementation of activities undertaken to strengthen independent smallholder farmer institutions. The SAST technique is used to establish the critical assumptions that underlie the values at the foundation of the implementation of the institutional design of independent oil palm smallholders. The SAST method is used comprehensively by combining the overall results obtained into a series of assumptions that organize solutions to the challenges faced in the implementation of strengthening smallholder institutions. The formulation of assumptions is done through a problem-solving approach by uncovering assumptions that must be met in the activities of strengthening independent smallholder farmer institutions. The identification of strategic assumptions was obtained from the FGD, and 15 assumptions were obtained as an alternative to strengthening independent smallholder farmer institutions. The strategic assumptions that were identified for strengthening smallholder institutions are described in Table 7.

Based on the assumptions that are pre-requisites for the implementation of the institutional strengthening of independent smallholders, the assumptions are raised based on assumptions that are weighted as "important" and "definite." The assessment of each assumption's relative weight is calculated by determining the relative ranking of each component of the experts' answers. The results of the analysis using the SAST method are presented in the form of a graph of assumption ratings as shown in Figure 6.

The interrelatedness of the levels of importance and the certainty of the agreed-upon assumptions produced demonstrates that all assumptions are in Quadrant 1. This also means that the overall assumptions are part of the plans that certainly support the strengthening of independent smallholder institutions. Assumptions that have the highest score (Quadrant 1) need to be accommodated to be selected as an effort to strengthen independent oil palm smallholders. If examined further, the assumptions that are certain and important to be fulfilled fall into the category that must be implemented in relation to the successful implementation of the organization.

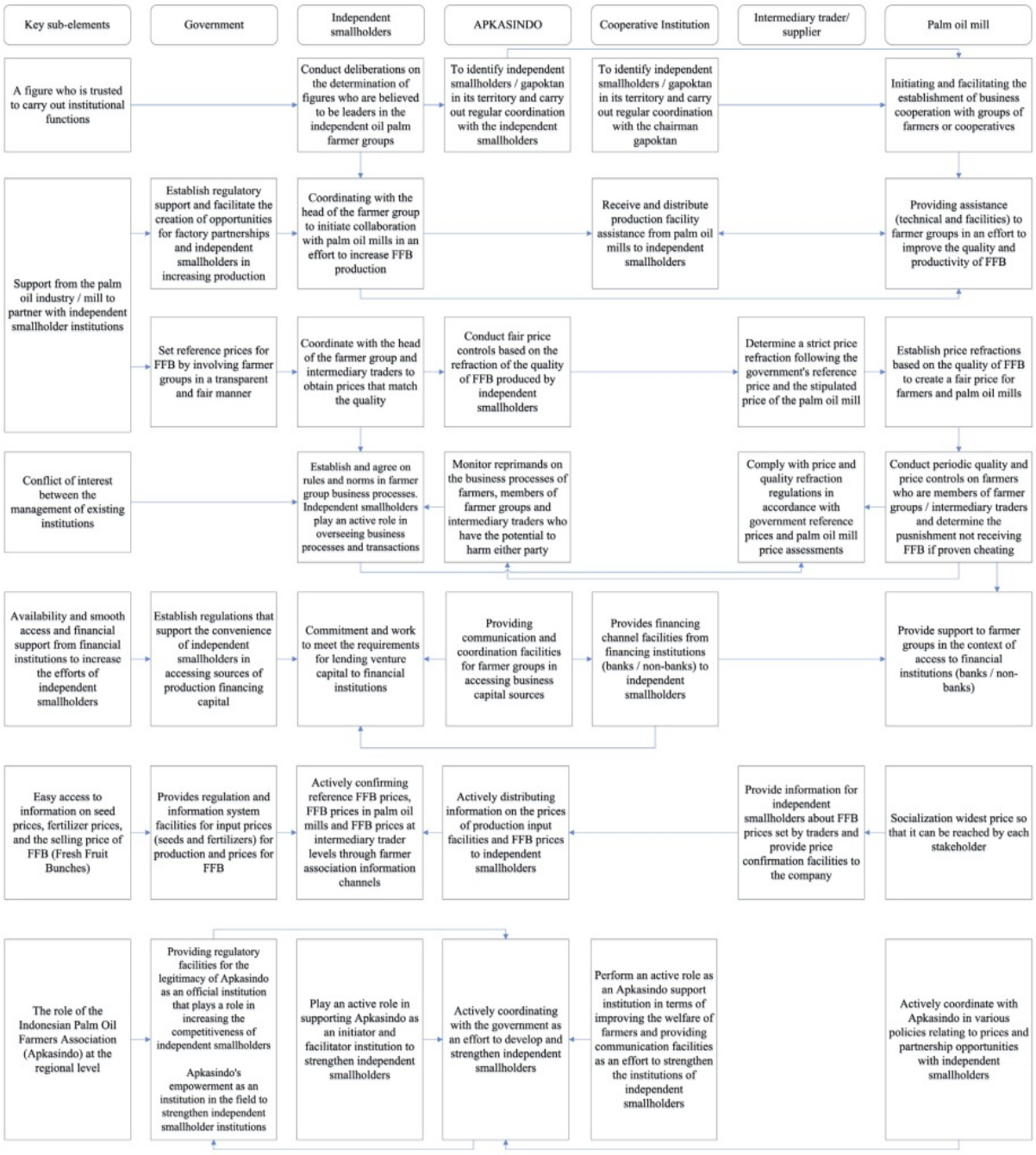

Figure 5. The purposeful activity model to strengthen institutions.

4.4.2. *Recommended institutional strengthening model*

To strengthen its position in the supply chain of oil palm agro-industries, independent smallholders need to be institutionalized and become an important part of various alternative forms of institutions. Some of the choices of institutions that might have a positive impact on oil palm independent smallholders include the KUB, the combined group of independent smallholders (*gapoktan*), or becoming part of a cooperative organization. However, the problem is that, institutionally, sometimes these institutions have not made a positive contribution to independent smallholders because of various aspects of administration, management, and organizational bureaucracy. Also, the legitimacy of membership is based only on unwritten laws and conventions that do not formally provide any binding legal force for independent farmers. Therefore, it is very important to enact a variety of rules and policies that provide strength and legal certainty and guarantees that have a positive impact and benefit both for independent smallholders and the organization as a whole.

Table 7. Strategic assumptions for strengthening smallholder institutions determined by SAST.

Strategic assumptions	
There is a party or figure who is "honest, trusted, has no personal interests" as a role model/motivator for the implementation of independent smallholder institutions	A1
The existence of regular meetings and clarity of the duties and functions (*tupoksi*) of each board in the institution	A2
There are parties or figures that have influence and connections with various stakeholders to coordinate and facilitate business cooperation.	A3
Increasing the role of the *Apkasindo* in empowering independent smallholders	A4
The need for local government intervention in building and strengthening the institutions of independent oil palm smallholders, for example, assistance and facilitation of the finance oil palm cultivation business and the provision of assistance for tools and production facilities for oil palm plantations	A5
Synchronization of policies and rules between related agencies at both the central and regional levels	A6
Facilitate the legality of independent smallholders' oil palm plantations through the loan-use process	A7
There is support from the palm oil industry/factory to partner with independent smallholder institutions.	A8
Establish a fair and transparent benchmark price for FFB by involving independent smallholder institutions	A9
Enforcement and control of the implementation of the FFB benchmark price in the FFB supply chain	A10
Equality of the position of smallholders in the process of cooperation with the industry	A11
There is technical guidance or integrated training related to the management of oil palm plantations.	A12
Availability and smooth access and support from financial institutions to increase the efforts of independent smallholders through independent smallholder institutions.	A13
The creation of a high sense of ownership and responsibility (commitment) from smallholders to perform business processes within the institutional umbrella of independent smallholders.	A14
There is a reward or incentive system in the purpose of monitoring the KPKSS business process for independent smallholders.	A15

According to the conceptual model and the assumptions, this research develops three institutional models that should be developed to strengthen oil palm smallholders. These are 1) corporate farming institutions, 2) the collaboration of independent cooperatives with village-owned enterprises (*bumdes*), and 3) the revitalization of palm oil independent smallholder associations. The corporate farming institutional model is based on the idea that smallholders who have integrated themselves into one form of institution such as group of smallholders can form a larger institution in the form of an economic institution with legal status such as a cooperative or another business entity, in accordance with the applicable regulations. The collaboration of independent cooperatives with village-owned enterprises (*bumdes*) that generally have

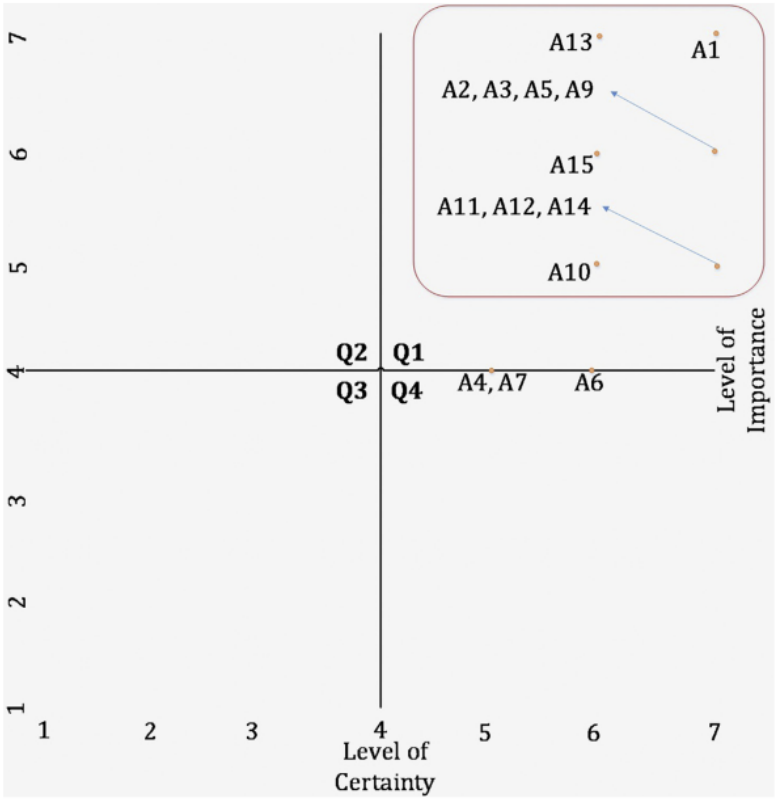

Figure 6. Assumption rating graph of strengthening independent smallholder institutions.

Table 8. Actors and their roles in the integrated institutional model.

No	Actors	Role and Responsible
1	Independent smallholders	• Merge into the Gapoktan or the KUB. • Ensure availability of FFB supplies through the application of GAP
2	Joint smallholders group (*Gapoktan*), smallholder group (KUB)	• Accommodating independent smallholders in a joint business group • Bridging the relationship of cooperation and partnership to one cooperative unit
3	Cooperative	• Act as a core actor in institutional strengthening of independent smallholders • Perform business management functions in integrated institutions • Become an intermediary and partner that connect raw material provider actors (KUB/Independent Smallholders) with oil palm processing companies through long-term cooperation contracts • Establish cooperation contracts with financial institutions related to the provision of venture capital and distribute it to members (independent smallholders) • Approve the provision of subsidies from BPDPKS in the replanting program
4	Secretary in Indonesian oil palm farmer association (*Apkasindo*)	• Become a key institution to improve the capacity-building of cooperative members • Function as an implementing agency and be responsible for the implementation of coaching and training, especially in the field of GAP
5	Oil palm research center (*Pusat Penelitian Kelapa Sawit*, PPKS)	• Become a supporting institution in providing quality seeds through long-term collaboration with local governments, especially related agencies
6	Oil Palm Plantation Fund Management Agency (BPDPKS)	• Become a supporting institution in providing capital and budgets for strengthening independent smallholders, especially in replanting programs • Provide other budgets that can support the performance and productivity of independent oil palm smallholders
7	Banking institutions	• Guarantee providing capital through a long-term soft credit program • Become a guarantor of scrip or collateral that is a condition of providing loan capital • Become an agency receiving the proceeds from the sale of FFB from an oil palm processing company and responsible for managing and distributing it to the cooperative in accordance with the agreed-upon contract
8	Agriculture and plantation service	Playing a role in providing support in the distribution of seeds obtained from oil palm research center (PPKS) and providing agricultural production facilities through a grant program
9	Offices of cooperatives and SMEs	Playing a role in providing support in strengthening organizational and institutional capabilities, both for cooperatives and independent smallholders as cooperative members
10	Palm oil processing company	Providing support for cooperation and partnership in supporting joint efforts to strengthen the institutions of oil palm independent smallholders

positive work programs for the development of independent smallholder businesses. To strengthen this institutional model, support from various parties is needed, both in providing easy access to capital and increasing the capacity and business performance of its members. The revitalization of palm oil independent smallholder's association (*Apkasindo*) model is based on the fact that, at the moment, the *Apkasindo*'s function is still being limited to programs and developmental activities, training, or capacity building for its members. A number of fundamental issues are also needed to improve the performance of independent smallholders, among others, in mediating the issue of the legality of their land or agricultural products as well as the certification of the plantation business, which is expected to be a guarantor and give confidence to palm oil processing companies on the downstream side. Also, the *Apkasindo* is still an association in which membership is voluntary and not all independent smallholders are willing to join the association.

Further, to complete the analysis, all recommended institutional models are integrated into one main model. The results of the analysis showed that the recommended institutional form, in the context of strengthening independent oil palm smallholders, was an integrated institutional form in which independent cooperatives became core institutions. An independent cooperative is formed based on the needs and awareness of the independent smallholders. This institutional form will be able to run well through the existence of a figure that is trusted by members and sets the norms that must be obeyed by all of cooperative members.

However, in the context of strengthening the institutions of independent oil palm smallholders, support from various parties is also needed in accordance with the roles and tasks of each actor. As a core actor in strengthening the institutions of independent oil palm smallholders, independent cooperatives need the support of other related parties. The parties and roles required are described in Table 8.

Meanwhile, the integrated institutional conceptual model diagram of oil palm independent smallholders can be seen in Figure 7. The conceptual diagram of the integrated institutional focus of the function of partnerships between actors is key in improving performance and strengthening the position of independent smallholders in the palm oil supply chain. This needs to be supported by governmental regulations at the regional and central levels. The main strengthening that must be accomplished is within the scope of the KUB to ensure an increase of company trust, because in practice, the company has more trust in the traders. Certainty in the market is also an important point that must be considered in strengthening institutions of independent smallholders, because the increasing number of smallholders will create the possibility of oversupply, which is a linear function; a surplus in supply will cause falling prices. Thus, the institutional strengthening model that has been proposed can fundamentally accommodate these problems by improving the willingness of independent smallholders to institutionalize and by the existence of continuous cooperation contracts.

Furthermore, to facilitate reading the results of studies on the institutional strengthening of independent smallholders, the overall model discussed is summarized in the form of a modified BMC, as shown in Figure 8. Modifications to the BMC are implemented in the bottom two blocks, which discuss the benefits obtained and inhibiting factors in accordance with the results of previous studies. Further, as current issues in business modeling, recommended that attention should be paid to sustainability (Joyce and Paquin, 2016), this paper proposes a business model that has social considerations.

The BMC is commonly designed as the business strategy of the company (Pamungkassari, 2018). In this case, the BMC is applied to assist the managerial strengthening of oil palm smallholder institutions. To apply the BMC in the field, it should pay attention to all of the blocks in the model. Before implementation, all stakeholders that are involved in the model should recharge the model perspective. As previously mentioned, the main goal of the conceptual model is to develop the conceptual model in strengthening smallholder institutions in the oil palm industry. All stakeholders that are involved in the model should

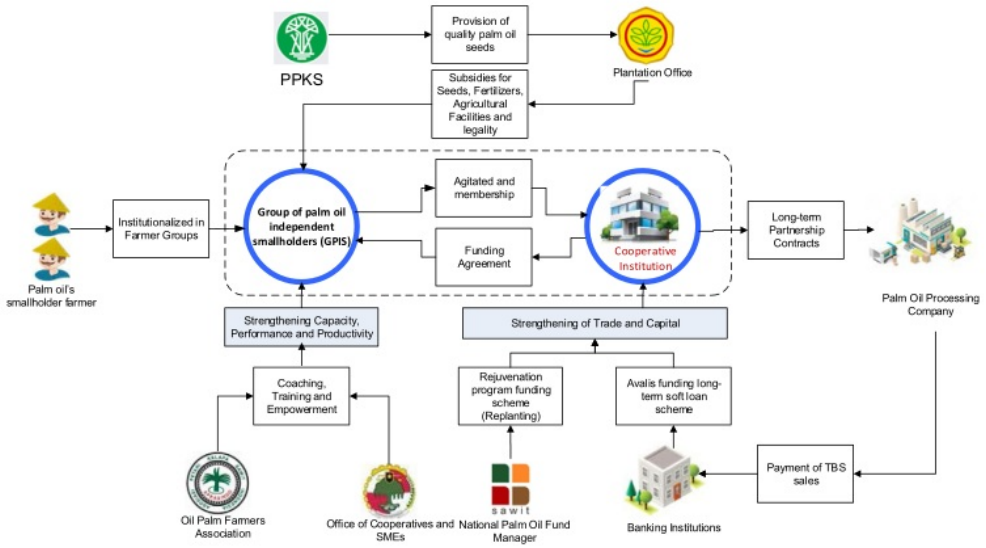

Figure 7. Recommendations for integrated institutional forms for oil palm independent smallholders.

CANVAS BUSINESS MODEL IN THE INSTITUTION OF OIL PALM SMALLHOLDER

KEY ACTIVITIES

1. Carry out managerial functions in the institutional business terintegratif
2. Become an intermediary and partner that connects the raw material provider actors (Gapoktan / Independent Smallholders) with palm oil processing companies through long-term cooperation contracts
3. Establish cooperation contracts with financial institutions related to the provision of venture capital and distribute it to members (Gapoktan / independent smallholders)
4. Provide recommendations to the Plantation Office in the context of providing subsidies from managers of the national oil palm fund in the replanting program
5. There is a reward and intensive system for monitoring business processes

KEY PARTNERS

1. Independent smallholders and / or farmer groups (Gapoktan)
2. Palm Oil Mill
3. Funding Institutions (BUMDes, Banks)
4. Government agencies at the local level (Plantation Office, Department of Cooperatives)
5. Association of independent smallholders (APKASINDO)

KEY RESOURCES

1. Trusted role models
2. Transparent and accountable managerial system
3. Availability of budget and financial support for institutional needs

PROPORTION OF VALUE

1.Improving the ability of independent smallholders in obtaining quality seeds and fertilizers
2.There is a fair and transparent benchmark price for FFB, risk and value added by involving farmer institutions
3.GAP improvement program to increase the ability and skills of independent smallholders
4.TBS underwriting long-term supply in a sustainable manner and in accordance with procedures through cooperation contracts
5.Creating conditions for improving the quality and productivity of independent smallholder FFB

CUSTOMER SEGMENTATION

1. Independent farmers
2. Indepedent smallholders group (poktan) / Joint Farmers Group (Gapoktan)
3. Farmers Cooperative

CHANNEL

1. Palm oil industry / mill support for partnership
2. Parties that have connections to various stakeholders
3. Government intervention in institutional development and strengthening

BENEFITS

1.An independent smallholder organization that is able to increase the income of independent smallholders and the performance of the supply chain in order to ensure a sustainable and quality supply of FFB
2.Increasing the active participation of government agencies and oil palm companies in order to improve the productivity and quality of independent smallholder FFB
3.Increased access to information on seed prices, fertilizer prices, and FFB selling prices

OBSTACLE FACTOR

1.Policy conflicts between government agencies
2.Strong influence / role of 'collectors' in the oil palm supply chain
3.Conflict interest of management in cooperative organizations
4.Limited capacity of institutions that play a role in the process of fostering independent palm oil farmers

Figure 8. Modification of the BMC for institutional strengthening.

have the goal of maintaining the business model. Aside from that, Chesbrough (2010) mentioned three points that should be accommodated in implementing the business model, these are key components and functions, component/stakeholder relations, and the way that the business creates value. Fortunately, all of these critical points have been mentioned in the conceptual model and the BMC for strengthening smallholder institutions.

Obstacles to be concerned about are policy, the collector's influence on the smallholder, conflicts of interest, and the limited capacity of developed institutions. These obstacles have to be minimized to develop

an integrated institutional model as elaborated above. Further, minimizing obstacles and developing the institutional model requires that all stakeholders coordinate and collaborate. To support this coordination, the "*key figure*" has to accommodate all stakeholder's requirements and facilitate relations among stakeholders and institutions.

4.5. Research contributions and limitations

The contribution of this research is in developing a conceptual model for strengthening smallholder institutions, especially for independent smallholders in the palm oil business. In fact, there are many conceptual models to strengthen smallholder institutions in many agricultural commodities; moreover, this research offers a specific problem to solve for palm oil smallholders. The framework of this research combined the SSM model with a hard system methodology. SSM is designed as the main framework, and it is supported by hard techniques involving ISM and SAST. This is one of the advantages of research that can analyze the condition of the real world from many perspectives and deliver solutions based on real-world problems. The conceptual model may be implemented for other commodity cases.

This paper successfully designs a new institutional model for strengthening the bargaining position of palm oil smallholders. This paper applies expert opinions and a soft methodology to accommodate the current situation in the field and deliver solutions to improve the system. Therefore, some important issues to assess in the future include the following:

1. The samples of the research are specific to two locations, the Riau and Jambi Provinces in Indonesia. To implement the conceptual model for another location, more attention should be paid to local farmer characteristics.
2. This research conducts a qualitative method that is supported by expert opinions. For further research, involving many experts from many perspectives may produce a comprehensive solution.
3. One of the fundamental problems in oil palm independent smallholder institutions is related to land ownership and legality. At present, many oil palm plantations are owned by independent smallholders but are believed to be illegal because they are in asylum areas. Meanwhile, oil palm has become one of the main livelihoods of rural communities by which people make ends meet. Because of this, studies related to land legality and its handling to meet the principles of sustainability, especially in terms of the social and environmental aspects, need to be done.
4. To follow up on land ownership and legality issues, other issues that have not been addressed are the lack of data related to the status of land ownership and the positions of independent smallholder oil palm plantations. Because of this, a study related to data collection on the status and mapping of the positions of independent smallholder oil palm plantations is very important.
5. This research has not yet presented the role of government, especially in terms of regulations and policies. Therefore, to strengthen oil palm institutions, in the future, it is necessary to conduct research related to government policies in the context of strengthening independent oil palm farmer institutions.

4.6. Managerial implications for strengthening oil palm independent smallholder institutions

The independent smallholder organization is basically a synergy of roles among the actors in the supply chain of the oil palm agro-industry. Efforts to strengthen institutions can only be done based on the awareness of the various parties who are jointly building an institutional form and who pioneer, grow, develop, and maintain it together. Sustainability of an institutional form will only persist in the long term if there is trust among the actors, and this can be done through the application of institutional governance in an honest, transparent, fair, and equitable manner and by prioritizing common interests above personal interests. The whole is embedded in a forum and intensive communication between the actors in an established institution. So, the main factor for strengthening and maintaining an institutional form of independent smallholders is very dependent on the level of trust among fellow actors in the supply chain of the oil palm agro-industry.

Efforts to strengthen the institutional capacity of independent smallholders also require joint support between the government and other business actors in the oil palm agro-industrial supply chain. Institutional issues do not only occur at the level of oil palm plantation businesses but fundamentally occur at the strategic level, especially related to the establishment of policy rules, cross-sectoral coordination, and trade governance, as well as cooperation and partnership between the relevant parties that impact on the bargaining positions of independent smallholders.

On the other hand, cooperatives as an institution—expected to spearhead the efforts to strengthen the institutional capacity of independent smallholders—have not been able to move optimally because of various obstacles, both within the internal scope of the organization and in relation to institutions in the supply chain of the oil palm agro-industry. Because of this, to strengthen the institutional capacity of independent smallholders, several actions need to be taken jointly between related parties:

1 At the government level, the relevant sectors need to coordinate and discuss the best solutions for solving problems of land legality, trade management, and the government's stance on international perspectives related to the sustainable development of the oil palm agro-industry in Indonesia.
2 Knowledge of the independent smallholders' existing conditions as a whole is absolutely necessary for making policy decisions and planning for the strengthening of smallholders in the future. Data collection and mapping related to ownership status, land position, production capability, and the number of independent smallholders need to be done so that planned strengthening programs can be more on target.
3 The government needs to establish an ideal institutional model to provide the best impact for oil palm independent smallholders in Indonesia. It requires deeper study to determine the best institutional form possible to be applied in every region of Indonesia.
4 The seriousness of efforts to strengthen independent institutional smallholders requires adequate budget availability. The data collection on the profile and status of independent smallholders, the determination of programs for institutional strengthening of independent smallholders, and the establishment of ideal institutions certainly require the availability of resources and budgets.
5 At the level of business actors, particularly cooperatives as the spearhead of institutional strengthening of independent smallholders, it is also necessary to strengthen the managerial capacities and capabilities that meet the principles of transparency and accountability. This is important to give confidence to independent smallholders so that they are willing to make cooperatives the place that they depend on to meet all of their business needs.
6 Institutional sustainability of independent smallholders requires a role model that is trusted by all members, who can become an intermediary in solving problems and an advisor in the decision-making process.

5. Conclusions and recommendations

5.1. Conclusions

There are many institutional issues that have a considerable influence on the bargaining positions of independent smallholders in the oil palm

agro-industry supply chain. Some important issues that need attention are the legality of land, the low quality of FFB production (which impacts selling price), the dilemma of platform's existence as an intermediary between independent smallholders and oil palm processing companies (which lengthens the supply chain and negatively impacts sufficient price separation), and lack of organizational managerial ability (which causes independent smallholders to distrust cooperatives), as well as other technical capability issues related to GAP that have an impact on the quality of FFB production.

Problems that occur on the level of business actors have a direct or indirect impact on independent smallholders because of problems at the strategic level. The issue of cross-sectoral coordination and harmonization has an impact on the establishment of policy rules is fundamental problem that must be addressed jointly by the relevant government. Because of this, institutional improvement is absolutely necessary, both in the context of the vertical relationship between the government and business actors in the oil palm agro-industry supply chain, as well as horizontal relationships at the government level and the level of business actors in the oil palm supply chain.

The independent smallholder capacities that require strengthening are 1) champions who can provide confidence to independent smallholders; 2) support from all parties, both the government and other business actors in accordance with their respective capacities and roles; 3) programs that facilitate independent smallholders obtaining access to capital to increase business capacity; 4) government intervention and support, especially in the form of providing assistance in the basic needs of independent smallholders' oil palm plantations; and 5) technical support from related parties, especially oil palm agro-industry companies in the context of improving the quality of FFB production through various activities that lead to the implementation of GAP.

This research proposed an integrated institution to strengthen smallholders in which independent cooperatives become core institutions. These integrated institutions are required for all related parties to accommodate the needs of oil palm stakeholders. The tasks and roles of all related parties and stakeholders in the business process should be well defined before being implemented in the real world.

5.2. Recommendations

Based on these conclusions, to complete the research on the institutional strengthening of independent smallholders, it is necessary to require the implementation of institutional formation programs in a more concrete form that integrates cooperation from relevant governmental and non-governmental institutions. Also, the existing cooperative empowerment program is needed for assistance during certain periods. Programs for the implementation of institutional strengthening must also be performed through collaboration, synergy, and joint management between the relevant institutions to create and realize independent smallholders and independent cooperatives that are competitive.

Declarations

Author contribution statement

M. Marimin: Conceived and designed the experiments; Analyzed and interpreted the data; Wrote the paper.

S. Raharja, M. Machfud and M.Y. Massijaya: Conceived and designed the experiments; Performed the experiments; Wrote the paper.

P. Papilo and S. Safriyana: Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

M. Asrol: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

M. A. Darmawan: Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or datar.

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Competing interest statement

The authors declare no conflict of interest.

Additional information

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